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Abstract

This report contains 20 summary-descriptions of curriculum programs and materials selected by the Institute for possible inclusion in its synthesis and validation of a K-6 process-promoting curriculum. Each description includes information on the developer and publisher plus a list of references (mostly published descriptions and critiques). Entries are "Science Curriculum Improvement Study" (SCIS) for K-6; "Elementary Science Study" (ESS); "Science--A Process Approach" for K-6; "Sense and Tell," a preprimary science system; "SRA Social Science Laboratory Units" for grades 4-6; MATCH project: Materials and Activities for Teachers and Children on nonverbal learning and communication in social studies and other areas; "Man: A Course of Study" in upper elementary social studies; "The Madison Project" in modern mathematics, K-9; MINNEMAST Project in mathematics science, K-3; "Nuffield Mathematics Project," an approach to teaching ages 5-13; The Frostig "Program for the Development of Visual Perception," K-1; "Peabody Language Development Kits" for ages 3-9; "Kindergarten Evaluation of Learning Potential" (KELP); Primary and Intermediate Reading Program; Project REACCN for K-3 language arts and affective development; Project ME (ESEA Program of Movement Education) in K-6 physical education; "Learning to Think," K-1; National Schools Project productive thinking curriculum; The Teaching of Inquiry Skills to Elementary School Children; and "Productive Thinking Program" for grades 5-6. (JS)

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Report on the Analysis of Some Process-Oriented Curricula

An Annotated Listing

Program Report R101

October 1969

Eastern Regional Institute for Education

635 James Street

Syracuse, New York 13203

SP003274

This report was prepared by the
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THE EASTERN REGIONAL INSTITUTE FOR EDUCATION is a regional educational laboratory funded by the U.S. Office of Education. Established in 1966 under a charter granted by the New York State Board of Regents, the Institute is a private, nonprofit corporation whose stated purpose is to strengthen the total educational program with an "emphasis on improving curriculum, organization, instruction, and the efficiency of learning by students of differing abilities and characteristics in diverse school settings."

During two years of program activities, the Institute staff has demonstrated competence in dealing with a number of educational problems. Notable success has been achieved with installing a process-oriented science curriculum in New York and Pennsylvania elementary schools. The Institute is convinced that education can be improved significantly through a systematic, creative effort to bring additional process-oriented curricula into the elementary schools. Institute staff are experienced educators with backgrounds in administration, curriculum, educational measurement, evaluation, learning and motivation, psychology, and teaching.

TABLE OF CONTENTS

	page
Foreword	iv
Science Curriculum Improvement Study (SCIS)	1
Elementary Science Study (ESS)	3
Science--A Process Approach	4
Sense and Tell	7
SRA Social Science Laboratory Units	8
MATCH Project: Materials and Activities for Teachers and Children	10
Man: A Course of Study	11
The Madison Project	13
MINNEMAST Project	15
Nuffield Mathematics Project	17
The Frostig Program for the Development of Visual Perception	18
Peabody Language Development Kits	19
Kindergarten Evaluation of Learning Potential (KELP)	20
Primary and Intermediate Reading Program	21
Project BEACON	23
Project ME (ESEA Program of Movement Education)	24
Learning to Think	26
National Schools Project	27
The Teaching of Inquiry Skills to Elementary School Children	29
Productive Thinking Program	30

FOREWORD

The Eastern Regional Institute for Education is committed to a program of improving elementary school education through process-oriented curricula. This preliminary report represents the Institute's initial efforts to identify curricula for use in its program that focuses on the development of basic intellectual skills. The summary describes a select few from among several hundred programs identified and initially screened.

Institute staff are working with clusters of existing curricular components in the synthesis of an articulated process-promoting curriculum in the various content areas common to elementary schools. The curricular components selected include Man: A Course of Study, MATCH units, SRA Social Science Laboratory Units, Science--A Process Approach, and the Minnesota Mathematics and Science Teaching Project (selected units). Three articulated sequences currently are under development in the synthesis effort: a social studies sequence for Grades 4-6, a K-1 mathematics sequence, and a K-3 reading sequence. Parts of the mathematics and reading sequence have undergone one year of trial use in a collaborative school. The social studies sequence is scheduled for trial use and formative evaluation in September, 1969. A science sequence and an intermediate reading sequence will undergo synthesis for validation in a collaborative school beginning in the fall of 1970.

This summary was prepared by ERIE staff primarily for internal use at the Institute. Consequently, it does not provide complete, precise descriptions of all existing process-promoting curricula. It is intended to indicate some of the curricular programs and materials ERIE has selected for initial work in its synthesis effort. Other process-promoting programs will be added as search and analysis efforts continue.

Obviously, this report should not be interpreted as an endorsement of the curricula and materials described, but rather as a partial list of components thought to have potential for inclusion by ERIE in its synthesis and validation of a K-6 process-promoting curriculum.

Science Curriculum Improvement Study (SCIS)

Developed by: Robert Karplus, Director
Herbert D. Thier, Assistant Director
Science Curriculum Improvement Study
Lawrence Hall of Science
University of California at Berkeley
Berkeley, California 94720

Published and distributed by: Raytheon Education Co.
Boston, Massachusetts
with: American Science and Engineering
Boston, Massachusetts

SCIS is a sequential physical and life science curriculum suggested for grades K-6. The program deals primarily with the organization of knowledge and techniques of scientific inquiry. Altogether there are eleven existing and five to-be-completed long-term units, each of which typically contains a series of some 20 activities which may be spread over a number of weeks. Teacher's guides, student manuals, and kits of materials are provided for each unit of this program which uses a materials-centered approach. Exploratory behavior, observation, and manipulation are stressed. Appropriate explanatory scientific concepts are introduced later, and further classroom and field experiences then reinforce, refine, and enlarge upon the particular concepts. Many of the activities are designed to extend the range of the pupil's experience with usual objects in unusual ways. Although SCIS is meant to promote intellectual skills, these are not stated explicitly. Objectives are specified, often behaviorally, for each activity. The developers suggest that SCIS is concerned with the promotion of many additional, unstated behaviors, both cognitive and affective, which have the potential for transfer to many realms of experience.

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Karplus, R., & Thier, H.D. A new look at elementary school science. Chicago: Rand McNally, 1967.

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Karplus, R., & Thier, H.D. Science Curriculum Improvement Study. The Instructor, January 1965, 43-90.

Lawson, C.A. So little done--so much to do. Descriptive booklet, Science Curriculum Improvement Study, 1966.

Lawson, C.A. The life science program of the Science Curriculum Improvement Study. American Biology Teacher, 1967, 29(3). (Reprints available from SCIS)

Professional growth for teachers. New London, Connecticut: Croft Educational Services.

SCIS Newsletter. Berkeley, California: University of California at Berkeley, Department of Physics.

Seigelman, E. Feedback at Science Curriculum Improvement Study. Unpublished manuscript, 1968. (Obtainable from SCIS)

Stendler, C.B. Possibilities for research on logical reasoning in elementary school science programs. Unpublished manuscript. (Obtainable from SCIS)

Thier, H.D. A look at a first grader's understanding of matter. Journal of Research in Science Teaching, 1965, 3, 84-89.

Thier, H.D. New understandings about the young child's development. Professional Growth for Teachers, 1967-68 (1, Advance Planning: Elementary School Education, K-3). (Obtainable from SCIS)

Thier, H.D. The laboratory in elementary school science. Professional Growth for Teachers, 1966 (2, Elementary School Education, 4-6). (Obtainable from SCIS)

Thier, H.D. The seven year itch: American elementary education. Unpublished mimeo, 1968. (Obtainable from SCIS)

Thier, H.D. Who's ready to try a birthday school? Nation's Schools, 1967, 80(3).

Thier, H.D., Powell, C.A., & Karplus, R. A concept of matter for the first grade. Journal of Research in Science Teaching, 1963, 1, 315-318.

Elementary Science Study (ESS)

Developed by: Randolph R. Brown, Director
Elementary Science Study
Education Development Center
55 Chapel Street
Newton, Massachusetts 02160

Published by: Webster Division
McGraw-Hill Book Company

Elementary Science Study has developed meaningful science materials for use by elementary school pupils. These materials are presented in the form of flexible units which can be arranged in various sequences to meet individual school/classroom requirements. The main concern of the project has not been science-learning *per se* but a method of introducing experiences into the classroom. The materials do not constitute a course of study, nor is any one component deliberately related to any other. The emphasis is on "messing around" in an unstructured and exploratory fashion by the individual child with little direction from, but much participation by, the teacher. Optimal use of ESS materials and suggested activities should occur if the teacher is as challenged by them as the pupils are. To date, 55 units have been developed at least to the trial teaching stage, 50 of which are hoped to be in published form by October, 1969. Units vary greatly in subject matter, conception, design, and materials. Suggested grade designations range from more restricted (i.e. Mystery Powders: 3-4) to very broad (i.e. Attribute Games and Problems: K-8). Student materials are packaged in classroom and sometimes small-group kits, and may include commonplace items, equipment and instruments, worksheets or guides, stimulus cards, and film loops. Teacher's guides and, occasionally, teacher's kits, accompany each unit. Neither content nor behavioral objectives are specified, nor is it the intent of the program to achieve particular objectives other than individual discovery and divergent production. The units, however, have the potential for promoting a great variety of intellectual skills. The materials have been used with equal success in a variety of socioeconomic, geographic, and demographic settings.

References

ESS Newsletter. Newton, Mass.: Education Development Center, Elementary Science Study.

Hawkins, D. Messing about in science. Science and Children, 1965, 2(5).

Introduction to the Elementary Science Study. Washington, D.C.: Educational Services, Inc., 1966. (Obtainable from Education Development Center, Boston, Mass.)

Science--A Process Approach

Developed by: Commission on Science Education of the American Association for the Advancement of Science
1515 Massachusetts Avenue, N.W.
Washington, D.C. 20001
John Mayor, Director

Published by: Xerox Corporation
Department SB
600 Madison Avenue
New York, New York 10022

This is a complete K-6 basic science program designed to involve learners in the processes of science; it is not a textbook course. The program includes (1) teaching guide; (2) pupil manipulative materials for investigation; and (3) validated evaluation measures. This curriculum is divided into parts, one part for each grade. Part A consists of exercises that would normally be taught in kindergarten; Part B of exercises for first grade, and so on. The material would function easily in a non-graded or individualized program.

Through a program of active individual participation pupils learn to use the intellectual tools and skills of science; they learn to think and to work much as scientists think and work. The skills specified in this program as the essential processes of scientific inquiry include:

- Observing
- Using Space/Time Relationships
- Using Numbers
- Measuring
- Classifying
- Communicating
- Inferring
- Formulating Hypotheses
- Controlling Variables
- Interpreting Data
- Defining Operationally
- Experimenting
- Predicting

Through the systematic use of simpler processes in the primary grades, the pupils become equipped to handle the more complex processes in subsequent grades. They learn to express themselves, to communicate both orally and in writing as they sharpen their observational and analytical skills and discover new (to them) information through personal experience. The skills acquired and developed are crucial for all basic curriculum areas, particularly for elementary mathematics and language arts.

The teaching strategy requires that the pupils be encouraged to examine divergent ideas, to systematically gather data, to evaluate, and to invent systems for further investigations. The level of these pupil-centered activities varies with both the maturity and the experience of the pupils.

Continued. . .

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Science--A Process Approach. The Process Instrument. New York: Xerox Education Division, 1967, in press.

Science--A Process Approach. Guide for the Instructor of a Teacher Education Program. (2nd edition) Washington, D.C.: American Association for the Advancement of Science, 1967.

Science--A Process Approach. Parts A-C. New York: Xerox Education Division, 1967. Parts D and E, 1968.

Science--A Process Approach. Process Hierarchy Chart. New York: Xerox Education Division, 1967.

Walbesser, H.H. Curriculum evaluation by means of behavioral objectives. Journal of Research in Science Teaching, 1963, 1, 296-301.

Walbesser, H.H. Science curriculum evaluation: Observations on a position. The Science Teacher, 1966, 33, 34-39.

Walbesser, H.H., & Carter, H. Acquisition of elementary science behavior by children of disadvantaged families. Educational Leadership, 1968, 8(No. 25), 741-48.

Available from American Association for Advancement of Science, Washington, D.C.:

An Evaluation model and its application, 1965. (out of print)

Newsletter, AAAS Commission on Science Education, 4 numbers per school year, beginning with fall issue. Vols. 1-4, 1964-1968.

Science--A Process Approach, Parts 6 and 7, Fourth Experimental Edition. (Use of instructional materials restricted to designated schools and tryout centers.)

Science--A Process Approach, Commentary for Teachers.

Science--A Process Approach, Guide for the Instruction of a Teacher Education Program, 2nd edition, 1967.

The Psychological Bases of Science--A Process Approach, 2nd edition, 1967.

Sense and Tell

Developed by: J. Stanley Marshall*
Dean, College of Education
Florida State University
Tallahassee, Florida

Illa Podendorf
Chairman, Science Department
The Laboratory Schools
University of Chicago
Chicago, Illinois

Clifford Swartz
Department of Physics
State University of New York
at Stony Brook
Stony Brook, New York

Peter B. Shoresman
Associate Professor of Science Education
University of Illinois
Urbana, Illinois

Published by: Scott-Foresman, Glenview, Illinois

Unit One of Scott-Foresman's Pre-Primary Science System

Both Sense and Tell, Unit One, and Living Things, Unit Two, are designed to develop the skills of observing, communicating, classifying, measuring, and inferring in pre-school through kindergarten pupils. The materials in Sense and Tell consist of two Mystery Boxes (large cardboard boxes into which the children can reach without seeing the contents), and six trays of equipment, containing two and three-dimensional objects of varying shapes, sizes, weights, colors, and textures, some photographs of these objects, and some familiar things. The Teacher's Guidebook thoroughly outlines activities and assessment tasks, including carefully-stated behavioral goals for each. Lessons are designed for small group work (approximately 10), although certain activities require different groupings. The unit can be used as an introduction to AAAS Science--A Process Approach, or to any other elementary science experiences.

References

Sense and tell: Teacher's guidebook. Glenview, Illinois: Scott-Foresman and Company, 1968.

The new Guidebook provides a great deal of information and background on the entire Pre-Primary Science System as well as Unit 1: Sense and Tell.

*Dr. Marshall is now President of Florida State University.

SRA Social Science Laboratory Units

Developed by: Ronald Lippitt, Robert Fox, and Lucille Schaible
Institute for Social Research
University of Michigan
Ann Arbor, Michigan

Published by: Science Research Associates, Chicago, Illinois

The Social Science Laboratory Units bring social science into grades 4, 5, and 6. The program provides an inquiry approach into the causes and effects of human behavior. The seven units can all be taught in one year, or the existing curriculum may be supplemented by one or more of the units. Each unit requires approximately 4-6 weeks to complete. Materials consist of a resource book containing reading selections, an individual project book for each unit, and recordings keyed to important ideas. The teacher's guide gives detailed instructions for implementing the program and a second teacher's book provides necessary background material for orientation and training. Some of the skills developed are observing, inferring, classifying, communicating, collecting and organizing data, predicting, hypothesizing, identifying and formulating values and value judgements, and decision-making. Behavioral objectives and assessment tasks are not included, although they are dealt with in the teacher resource book. The seven units cover the following topics:

I. Learning to Use Social Science (introduction to methodology and tools of social science; prerequisite to all other units)

II. Discovering Differences (cultural differences, stereotypes)

III. Friendly and Unfriendly Behavior (social interaction, feelings, intentions)

IV. Being and Becoming (development, heredity, and environment)

V. Individuals and Groups (group processes, leadership, membership)

VI. Deciding and Doing (decision-making)

VII. Influencing Each Other (influence, social power, halo effect)

Continued. . .

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Lippit, R.; Fox, R., & Schaible, L. The teacher's role in social science investigation. (Teacher Resource Booklet: Companion to SRA Social Science Laboratory Units) Chicago: Science Research Associates, 1969.

Other useful resources:

Chesler, M., & Fox, R. Role-playing methods in the classroom. Chicago: Science Research Associates, 1966.

Fox., R.; Luszki, M.B., & Schmuck, R. Diagnosing classroom learning environments. Chicago: Science Research Associates, 1966.

Schmuck, R.; Chesler, M., & Lippitt, R. Problem solving to improve classroom learning. Chicago: Science Research Associates, 1966.

MATCH Project: Materials and Activities for Teachers and Children

Developed by: The Children's Museum
Jamaicaway
Boston, Massachusetts 02180
Project Director: Fred Kresse

Produced and Distributed by: American Science and Engineering, Inc.
20 Overland Street
Boston, Massachusetts 02215

This four-year project demonstrates and explores the characteristics of self-contained multi-media kits designed to promote non-verbal learning and communication in the elementary classroom. Each MATCH Box is a system of materials and activities organized and activated by a Teacher's Guide. Materials consist primarily of real, concrete objects combined with films, pictures, recordings, models, maps, and books. The kits are designed to circulate from class to class, and to be used from two to four weeks, one to one and a half hours a day. Sixteen units have been developed, three of which are commercially available at present: Japanese Family (grades 5,6), The City (1-4), A House of Ancient Greece (5,6). All units circulate on a loan basis from the Children's Museum. They are mostly in the realm of social studies, but some are in science, and some do not fit into any subject-matter organization. Each unit usually is based around one teaching strategy (e.g. role-playing, problem-solving). Although no behavioral objectives are provided, many of the units promote a variety of intellectual processes central to other process curricula and could supplement other curricular materials.

References

Fact sheet for the MATCH Box market test. Boston: American Science and Engineering, Inc., Education Division, 1968.

Kresse, F.H. Volume I: Materials and Activities for Teachers and Children: A project to develop and evaluate multi-media kits for elementary schools. Volume II: Appendices. (U.S. Department of Health, Education, and Welfare, Office of Education, Project No. 5-0710) Boston: The Children's Museum, 1968.

MATCH Boxes (descriptive brochure) American Education, December, 1966-January, 1967.

MATCH Units: Unique new learning systems in elementary social studies (descriptive brochure) Boston: American Science and Engineering, Inc., Education Division, 1968.

Man: A Course of Study

Developed by: Peter Dow, Director
Social Studies Curriculum Program
Education Development Center
15 Mifflin Place
Cambridge, Massachusetts 02138

Consulting Scholars: Jerome S. Bruner, Director
Center for Cognitive Studies
Harvard University

Irven DeVore
Professor of Anthropology
Harvard University

Asen Balikci
Professor of Anthropology
University of Montreal

Published by: Education Development Center
Cambridge, Massachusetts

Man: A Course of Study is a one-year, upper elementary social studies course designed to develop an appreciation for the humanness of man. Three questions define its major concerns:

What is human about human beings?
How did they get that way?
How can they be made more so?

The first half of the course examines man as a species, and introduces fundamental questions about man's nature via animal contrasts, notably the salmon, the herring gull, and the baboon. Man as a product of culture is explored in the second half through a study of the Netsilik Eskimos. Five great "humanizing forces" recur as underlying themes throughout the course: language, technology (or adaptation, and including intellectual tools), social organization, the management of a prolonged childhood (learning), and the urge to explain one's world (beliefs, myths, symbolism). The program provides repeated opportunities for pupils to note the generality of these types of human behaviors across all cultures including their own.

This is a question-raising rather than a question-answering course. The program does not state behavioral objectives. However, it purposefully attempts to promote a wide range of intellectual skills required in higher order cognitive and affective problem solution. Of primary concern are questions of values and attitudes. Through classroom discussion, students and teacher together explore issues of reproduction, aggression, killing, religion and life and death, in an attempt to gain perspective of and insight into themselves and all men, of whatever race or culture.

Continued. . .

Materials are multimedia, with film as the primary source of data. In color, with natural sound and often no commentary, films are used to simulate field observations. In addition, there are a number of small well-illustrated booklets of differing style, format, and purpose ("concept" books, field notes, journals, poems, stories, etc.). A third major medium is games and construction exercises, in which the strategies are defined by the cultural norms and constraints of the people being studied. Other materials include records, filmstrips, maps, photographs, observation records, and a set of teacher's guides containing background information, bibliography, and activities. Materials are provided in extent and style for all student types and levels. Activities, other than film-watching, are primarily small-group and individual.

An inservice workshop program using readings, tapes, and films designed exclusively for teacher use accompanies the course. Acquisition and implementation of Man: A Course of Study are contingent upon meeting teacher education requirements. Full information may be obtained from the developers.

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Bruner, J. S. Toward a theory of instruction. New York: W. W. Norton & Co., 1966.

Bruner, J.S., & Dow, P.B. Man: A Course of Study. Cambridge, Mass.: Education Development Center, 1967.

Evaluation in the social studies: An experimental design. Unpublished manuscript, Education Development Center, 1969.

Evaluation of Man: A Course of Study--Preliminary report. (unpublished mimeo) Cambridge, Mass.: Education Development Center, 1969. (Obtainable from Education Development Center)

The Madison Project

A Modern Mathematics Program as it pertains to the interrelationships of mathematical content, teaching methods and classroom atmosphere.

Developed by: Robert B. Davis
School of Education
Syracuse University
Syracuse, New York 13210

Published by: Addison-Wesley Company

There are a number of distinguishable programs that can be identified. They might be described very briefly as:

Curriculum alpha: A basic curriculum, primarily for grades 2-8 (although use with older students is feasible), intended to provide the basic lessons necessary to begin to unify arithmetic with algebra, geometry, and physical science.

Curriculum beta: An assembled curriculum, consisting of original Madison Project lessons (actually, Curriculum alpha combined with lessons developed by other projects and individuals, especially by Edith Briggs, by the Elementary Science Study of EDC, and by the Nuffield Mathematics Project directed by Geoffrey Matthews). It differs from Curriculum alpha in that Curriculum beta places greater emphasis on arithmetic, greather emphasis on science, involves a variety of approaches to geometry, makes more use of physical materials, and is designed for more emphasis in small-group work and individualized instruction.

Curriculum gamma: A simplified curriculum for nursery school, kindergarten, and grades 1-2.

Curriculum delta: A grade 9 course for college-capable students.

Curriculum epsilon: A sophisticated program for grades 3-8 that has been used successfully with culturally privileged and culturally deprived children. Hence, cultural deprivation, as usually estimated, does not seem crucial. However, the developer of this program notes that it may lack stability. It works successfully for some teachers, for some classes, and in some schools.

There are several paper-backed books to be used as student materials, and a large number of films and audio tapes to be used with the teachers.

Continued. . .

The program is based on the statement that the process, rather than the result, is of prime importance. Processes and skills which are explicitly promoted are analysis, explication, divergent thinking, re-formulating (generalization and implication), using axiomatic systems, re-defining and extending systems. Behavioral goals are not specified.

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Davis, R.B. Experimental course report/grade nine. Experimental course report no. 1, June 1964, The Madison Project.

Davis, R.B. First lesson (description of 16mm sound motion picture). The Madison Project.

Davis, R.B. Some remarks on "learning by discovery". The Madison Project.

Davis, R.B. The evolution of school mathematics. Journal of Research in Science Teaching, 1963, 1, 260-264. (Obtainable from the Madison Project)

Davis, R.B. The Madison Project's approach to a theory of instruction. Journal of Research in Science Teaching, 1964, 2, 146-162. (Obtainable from the Madison Project)

Machtinger, D.D. Experimental course report/Kindergarten. Experimental course report no. 2, June 1965, The Madison Project.

The Madison Project presents materials for a supplementary mathematics program for grades 2 through 8. Newsletter No. 1, July, 1965.

MINNEMAST Project

Developed by: Minnesota Mathematics and Science Teaching Project (MINNEMAST)
720 Washington Avenue, S. E.
Minneapolis, Minnesota 55414
Director: James H. Werntz

Distributed by: MINNEMAST Project (No commerical publisher to date)

This combined mathematics science program will have a completed K-3 sequence (21 units) fully developed by September, 1970. Several units of an experimental nature are available for grades 4-6. Printed materials for each unit include a teacher's manual and various teaching aids. Except for the kindergarten units, there are student manuals which contain the associated worksheets. Apparatus kits for each grade level, packaged for classes of 35, provide items designed especially for the project. These include Minnebars (wooden rods of square cross-section and lengths varying from 1-10 cube units) and Property Blocks (similar to attribute blocks of other programs). Other standard items (e.g., modeling clay and corks) are included in the kits, as well as suggestions for appropriate use. Four main themes run through the K-1 math program: (1) conservation (2) one-to-one correspondence (3) linear order and (4) number representation. A spiral approach is used; topics are re-introduced at more advanced levels throughout the program. In addition, six major intellectual skills or operations are emphasized throughout this inquiry approach to mathematics and science: observation, measurement, experimentation, description, generalization, and deduction. Stress is on discovery, investigation, and manipulation of concrete objects by individuals and small groups. Teacher strategies include demonstration, games, provocative stories, and worksheets. Evaluation instruments (other than worksheets) and behavioral objectives are not provided.

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Rosenbloom, P. C. The next step in school mathematics. Delivered at the Spring Conference of the Minnesota Council of Teachers of Mathematics, April, 1962.

Nuffield Mathematics Project

Developed by: Geoffrey Matthews
Project Director
12 Upper Belgrave Street
London, S. W. 1, ENGLAND

Published by: W & R Chambers and John Murray
John Wiley & Sons, Inc.
New York, New York

The aim of this program is to provide a contemporary approach for teaching mathematics to children aged 5-13. It does not focus on tests for children, but rather on teacher guides for use in lesson planning. The major topics covered are: (1) computation and structure (2) shape and size and (3) graphs leading to algebra. Methods of instruction include independent study, laboratory investigations, and small group project work. There is a minimum amount of teacher-led instruction for the entire group. Instruction is carried on both inside and outside the school building, utilizing objects in the environment. Children are in constant contact with physical objects; the program relies basically on the discovery approach.

The major skills promoted are formulating and testing hypotheses (inductive reasoning), deductive reasoning, communication, problem solving, looking, and listening.

References

Nuffield Mathematics Project. I do, and I understand. New York: John Wiley & Sons, 1967.

The Frostig Program for the Development of Visual Perception

Developed by: Marianne Frostig, Director
Learning Disabilities Center
University of California
Los Angeles, California

Published by: Follett Publishing Company
Chicago, Illinois

This visual perceptual program is designed for children in grades K-1. It also can be used through second grade with the culturally deprived, or at any grade level for children with developmentally impaired perception (i.e. deaf, mute, blind, retarded). Skill areas are: Visual-motor coordination, figure-round perception, perceptual constancy, perception of position in space, and perception of spatial relationships. The program consists of physical exercises, suggestions for three-dimensional activities, and worksheet exercises. Workbooks and teacher's guides are provided at three levels of difficulty, as well as an additional teacher's guide dealing with the overall program.

References

Teacher's Guide. The general guide for the program contains useful background information.

Peabody Language Development Kits

Developed by: Lloyd M. Dunn, Director
Institute on Mental Retardation and
Intellectual Development
George Peabody College
Nashville, Tennessee

James O. Smith
Professor of Special Education
University of Kansas
Lawrence, Kansas

Katherine B. Horton
Bill Wilkerson Hearing
and Speech Center
Vanderbilt University
Nashville, Tennessee

Published by: American Guidance Service, Inc.
Publishers' Building
Circle Pines, Minnesota 55014

The program consists of a series of four kits and activities designed to develop oral language skills and verbal abilities "involving divergent, convergent, and associative thinking." Levels P (Preschool), 1, 2, and 3 correspond roughly with mental ages 3-5, 4 1/2 - 6 1/2, 6-8, 7 1/2 - 9 1/2. Kit materials, stored in a metal carrying case, include a manual outlining the 180 daily lessons, stimulus cards, story cards, posters, plastic color chips, hand puppets, mannequins, records, and tape recordings. Lesson plans are complete and structured, and allow for teacher modification. Behavioral goals are not specified, although activities are outlined under descriptors such as: brainstorming time, classification time, critical thinking, describing, following directions, imagination, listening, memory, patterning, relationships, and touching. Activities are designed for group participation. They are presented as daily interludes from regular academic work and do not require reading or writing skills.

References

Teacher's Guides. The guides for each unit contain much useful background information.

The publishers will supply a list of research articles and other references on request.

Peabody Language Development Kits

Mueller, M.W., & Dunn, L.M. Effects of Level #1 of the Peabody Language Development Kits with educable mentally retarded children--an interim report after 4 1/2 months. Unpublished manuscript, Institute on Mental Retardation and Intellectual Development, George Peabody College for Teachers, 1966.

Kindergarten Evaluation of Learning Potential (KELP)

Developers: John A. R. Wilson
Associate Professor of Education
University of California
Santa Barbara, California

and

Mildred C. Robeck
Education Research Project Consultant
California State Department of Education
Sacramento, California

Published by: Webster Division, McGraw-Hill Book Company

Kindergarten Evaluation of Learning Potential was designed as both a learning and an evaluation instrument for children in kindergarten or first grade. It is based on a theoretical model which outlines three levels of learning: association, conceptualization, and creative, self-directed learning. KELP is meant to develop in the child the abilities and motivation on which he will be evaluated, to extend the observation skills of the teacher and provide guides for individual diagnosis and teaching, and to identify and make provision for exceptional children. Materials include record book and test booklets, beads, blocks, design cards, bolt and number boards, numerals, and safety signs, as well as a detailed textbook designed for use by the professional. The 11 test items cover activities called skipping, color identification, bead design, bolt board, block design, calendar, number boards, safety signs, name-writing, auditory perception, and social interaction. These are intended to tap a number of basic intellectual and psychomotor skills. Behavioral objectives are included.

References

Wilson, J.A.R., & Robeck, M.C. An introduction to KELP. New York: McGraw-Hill, Webster Division, 1967.

Wilson, J.A.R., & Robeck, M.C. Kindergarten evaluation of learning potential. New York: McGraw-Hill, Webster Division, 1963.

Primary and Intermediate Reading Program

Developed by: Eastern Regional Institute for Education
635 James Street
Syracuse, New York 13203
Program Director: Jane H. Root

In preparation: not available for distribution.

ERIE's Primary and Intermediate Reading Program is based on the premise that while some skills or reading behaviors can be introduced simultaneously, others have developmental or sequential implications. All aspects of mature reading should not be expected of the beginning reader. The Level A curriculum is based on reading prerequisites in the areas of motor skills, visual, auditory, and tactile discrimination, language development and thinking skills. Level B, an individually guided learning unit using cassettes, developed from the SRA Basic Reading series, is concerned with decoding from print to speech and comprehension development through listening experiences. Level C, a transition stage for skill consolidation, emphasizes literal comprehension and speed of perception using materials selected from children's literature. Level D is concerned with the development and application of mature reading skills as the student engages in purposeful reading. The student is introduced to literary forms and devices through narrative or poetic materials in a literature program, and to informational reading through expository materials which also constitute his social studies curriculum. All materials are organized to provide for individual selection with students of differing skills. Because materials are developmental, no grade level designation is appropriate; but, in practice, most children have sufficient basic reading skills to begin level D in what is traditionally third grade. Those unable to read sufficiently well may also be included in this program by using it as a listening experience. Meanwhile, they continue to develop the prerequisite reading skills in Levels A-C.

Materials:

Level A requires a resources center with commercial materials from many publishers. There is a placement testing battery. Teachers are urged to group children for skill development and to sequence and pace the learning experiences as the child evidences potential for growth.

Level B is mediated through cassette tapes programmed to produce decoding and comprehension skills behaviorally described. Successive testing of components assess mastery. Tapes are not currently commercially available.

Continued. . .

Level C. provides guided reading in books for individual selection based on the student's interest.

Level D broadens and applies skills in a variety of materials in literature and social studies with particular emphasis on a broad inventory of cognitive and affective processes. Such generalized behaviors as the ability to organize, classify, and sequence data; to translate this data into other forms; to infer; to identify, formulate, and justify values; to hypothesize--all are promoted through the medium of reading. When fully developed, this program will extend throughout the elementary school. It is now in trial operation in one school; materials are not yet available for distribution.

References

Root, J.H. General program description. Unpublished manuscript, Eastern Regional Institute for Education, 1969.

Root, J.H. Installation and procedures manual--Level A. (Includes objectives and bibliography of materials) Unpublished manuscript, Eastern Regional Institute for Education, 1969.

Project BEACON

Developed by: John M. Franco, Director
Project BEACON
John Williams School No. 5
555 Plymouth Avenue North
Rochester, New York 14608

Materials available from: City School District of Rochester

Project BEACON was developed to focus on upgrading achievement in primary grades. It is presently aimed at K-3 grade levels.

The following areas of attention within the project serve as its goals:

1. Building the child's self-image (ego development).
2. Early success in language arts.
3. Accent on working with parents.
4. Cultural environment.
5. Orientation and inservice training of teachers.
6. Negro history and culture.
7. Development of new materials to accomplish above goals.

The stress on ego-development is woven throughout all activities. Among the techniques used to foster positive self-regard are autobiographies, personal data charts, and photographs and movies of each child (in cooperation with Eastman-Kodak and Polaroid Corporation).

Materials consist of a Teacher's Ego Development Guide which outlines objectives for each unit, specific materials and resources that can be used (hardware, games, written materials, language development kits, films, correlations with regular subject matter), summary of activities, and rough guidelines for evaluation. Also included is a history of supplementary reference materials for both teacher and children. In general, suggested activities involve materials and resources from a variety of sources. The activities in each goal area are meant to be incorporated into the ongoing curriculum. The program is currently being used and evaluated extensively in the Rochester City School District in New York State.

References

Beacon lights. (descriptive booklet) Rochester, N.Y.: Project Beacon, City School District of Rochester.

Ego development guide for primary grade teachers. Rochester, N.Y.: Project Beacon, City School District of Rochester.

Project ME (ESEA Program of Movement Education)

Developed by: Joan Tillotson, Project Director
Title III ESEA
Bailey Avenue Elementary School
Plattsburgh, New York 12901

Joseph Allen
Northeast Regional Supplementary Education Center
8 North Platt Street
Plattsburgh, New York 12901

No published materials.

Movement Education is an innovative K-6 physical education program.

All children are seen as moving in their own unique fashion yet are encouraged, through exploration and problem-solving situations, to develop efficient and expressive ways of moving, to understand how their body moves, where it moves in space, and what its capabilities are. Development of the child's self-image as well as an increased sensitivity to others are important facets of the project. Children learn to move for many purposes, while an overriding objective for the teacher is "to concentrate on the process of learning rather than totally on the finished product."

Movement Education maintains that fundamental psychomotor skills are not the basis for a physical education program. Rather, the movement elements of time, space, force, and flow underlie those skills. Consequently, the program includes all of the games, rhythmic activities and gymnastics of physical education, but initiates these through the concentrated emphasis on the elements of movement. The problem-solving orientation involves divergent production skills such as fluency, flexibility, imagining, inventing. A teacher's guide is in preparation.

The program is currently under way at the primary and intermediate levels in the Plattsburgh (New York) school system.

Continued. . .

References

Program of Movement Education for Plattsburgh elementary schools: Application for federal grant to establish, operate and maintain a supplementary educational center and services; Title III ESEA, 1966.

Appendices to above proposal:

Appendix B: Definition, aim, objective of Movement Education, sample lesson plan, progression of problem-solving experiences.

Cardany, A. Appendix C: Curriculum consultant report, June, 1967.

Fleming, R.S. Appendix A: Report on program of Movement Education for Plattsburgh, New York elementary schools, an ESEA Title III project, May, 1968.

Howard, S. Appendix D: Movement Education consultant report #1, February, 1967.

Potts, M., & Davis, E. Appendix E: Research consultants report, 1967.

Other references:

Project ME, ESEA Program of Movement Education. (descriptive brochure) Evanston, Ill.: Lind Climber Co.

Questions and Answers about Movement Education. (descriptive brochure) Plattsburgh, New York.

Learning to Think

Developed by: Thelma Gwinn Thurstone
Professor of Education
University of North Carolina
Raleigh, North Carolina

Published by: Science Research Associates, Chicago, Illinois

The four levels of this process-oriented program span kindergarten through grade one. The series provides direct training in Thurstone's "Primary Mental Abilities" as well as being a reading readiness program. The skills dealt with are involved in verbal meaning, spatial operations, reasoning (e.g. classification, seriation), quantitative operations, word fluency, memory, motor abilities, and visual perception. A teacher's guide and pupil workbook for each level are the only materials involved, as the tasks are all paper-and-pencil.

References

Thurstone, T.G. Teacher's manuals for the Red Book, the Blue Book, the Green Book, the Gold Book. (Teacher's manuals include short statements about rationale and development of program, and about the Primary Mental Abilities) Chicago: Science Research Associates, 1967.

Thurstone, L.L., & Thurstone, T.G. Primary mental abilities: Technical report. Chicago: Science Research Associates, 1967. (Reorder No. 7-1806).

National Schools Project

Developed by: Frank Williams, Director
National Schools Project
Macalester College
Saint Paul, Minnesota

Existing published materials which have been used in the project are available from many sources. A list of these may be found in "Media for developing creative thinking in young children". No commercial publisher packages the entire set of materials used in the project.

The National Schools Project involved the development of a model for a "productive thinking" curriculum. The model is based on interpretations of the work of Guilford, Torrance, Bloom, Piaget, and others. It enumerates eight intellectual processes (fluency, flexibility, originality, elaboration, risk-taking, preference for complexity, curiosity, and imagination) and 23 teaching strategies which cut across all traditional elementary school content. The model was used for a teacher training program as the basis for selection and organization of existing materials and techniques to foster the development of the specified processes. The methods and materials organized and developed by the project were used in six elementary schools scattered throughout the country. The project is still in operation in two of the original schools and is being continued in one new school in California.

The project has resulted in a selection and cataloguing of existing materials (films,books, filmstrips) which are especially useful for the promotion of the particular processes. Another product has been a large number of "ideas" developed by teachers dealing with specific examples of how a given teaching strategy may be utilized to promote one of the processes through a given content area. Early evaluation has been concerned only with the effect of the program on teacher behavior. A long-term study to determine the effect of the program on pupil behavior is currently underway.

References

Hughes, M. et al. Frontiers of thinking. (Contains one of the four models of thinking used in synthesis by the National Schools Project) Faculty publication, William M. Stewart School, University of Utah.

Taylor, C.W., & Williams, F.E. (eds.) Instructional media and creativity. Proceedings of the 6th Utah Creativity Research Conference. New York: John Wiley & Sons, 1966.

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Williams, F.E. (ed.) Classroom ideas for developing productive-divergent thinking. St. Paul, Minnesota: National Schools Project, Macalester College, 1967.

Williams, F.E. Creativity: A bridge between the cognitive and affective domains. Paper presented at First Annual Special Education Symposium, Northern Illinois University, March 20-22, 1969.

Williams, F.E. (Ed.) Creativity at home and in school. St. Paul, Minnesota: Macalester Creativity Project, Macalester College, 1968.

Williams, F.E. Media for developing creative thinking in young children. Occasional Paper No. 3, 1968, Creative Education Foundation, Inc.

Williams, F.E. Workshops on the use and adaptation of new media for developing creativity. U.S. Department of Health, Education and Welfare, Office of Education, Project No. 6-1619. St. Paul, Minnesota: National Schools Project, Macalester College, 1968.

Williams, F.E., & Eberle, R.F. Content-process practice: Creative production in the classroom. Report on the cooperative summer institute, 1967. Edwardsville, Ill.: Creative Concepts Unlimited, 1968.

The Teaching of Inquiry Skills to Elementary School Children

Developed by: Jerome S. Allender
College of Education
Temple University
Philadelphia, Pennsylvania 19122

No published materials.

This summary is based on the final report of USOE Project Number 5-0594 which relates the research done over a period of three years in various elementary schools. The purpose of the project was to describe inquiry behavior in grade school children and to test for the effect of teaching methods and teaching environments on their inquiry activity. For purposes of designing the task and deriving scores, the inquiry process was differentiated in terms of problem sensitivity, problem formulation, search behavior, and resolution.

Entitled I am the Mayor, the materials offer the children opportunity to play the role of the mayor of a small city--coping with various problems, seeking information relevant to the problems, and finally offering resolution to these conflicts. A number of measures were employed to score the elements, thus providing data for the conclusions.

The conclusions generally reported that children will engage in inquiry activity when given the opportunity and that they can be meaningfully differentiated on the basis of the time they spend inquiring. Children who spend more time see more problems, ask more questions, and use more information. Inquiry scores are highly intercorrelated; they are relatively uncorrelated with other variables, although they tend to increase with grade level. Finally, a teaching environment can effectively increase inquiry activity--comparably, under teacher direction or student direction.

References

Allender, J.S. The teaching of inquiry skills to elementary school children. Project No. 5-0594. Washington, D.C.:. U.S. Department of Health, Education and Welfare, 1968.

Productive Thinking Program

Developed by: Richard S. Crutchfield and Martin V. Covington
Department of Psychology
University of California
Berkeley, California 94720

Distributed by: Educational Innovation
Box 9248
Berkeley, California 94719

Title: The Productive Thinking Program, Series One: General Problem Solving

The program is a set of carefully developed instructional materials specifically designed to develop and reinforce higher order problem-solving skills and strategies in 5th or 6th grade children. The materials consist of 16 programmed lessons, each in a comic-book format of about 40 pages in length, which present mysteries to be solved by and with the chief characters (two intermediate-school-aged children and their uncle). Lessons are self-administering and last about one hour each. Some of the skills dealt with in the program are problem recognition and formulation, organization of information, idea generation, hypothesis-testing, as well as positive affect towards thinking and problem solution.

Evidence from several studies shows the program to be most effective when children are expected and allowed to apply the problem solving skills. The program begins to develop to a variety of other situations and activities. The characteristics and effectiveness of the program have been extensively studied in many classrooms.

References

Bavry, J.L., & Klausmeier, H.J. A structure of a productive thinking battery. Paper presented at the annual meeting of the American Educational Research Association, Los Angeles, February 5-8, 1969.

**Blank, S.S. Inquiry training through programmed instruction. (Doctoral dissertation, University of California) Ann Arbor: Mich.: University Microfilms, 1963.

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Covington, M.V. An experimental program for increasing ingenuity in visual problem solving. Studies in Art Education, 1969, in press.

Covington, M.V. Cognitive growth, development, and a cognitive curriculum. Paper read at symposium, Productive Thinking in the Classroom, American Psychological Association convention, San Francisco, California, September, 1968.

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**Covington, M.V. Fostering originality in visual problem solving by programmed instruction techniques. Paper read at Western Psychological Association, San Francisco, California, May, 1967.

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Covington, M.V. New directions in the appraisal of creative thinking potential. Journal of Educational Measurement, 1968, in press.

Covington, M.V. Productive thinking and a cognitive curriculum. Invited paper at symposium, Studies of the Inquiry Processes, American Psychological Association, Washington, D.C., September, 1967.

**Covington, M.V. Programmed instruction for the intellectually gifted: Experiments in productive thinking. Cited in Special Education: Strategies for Educational Progress. Proceedings of the International Council for Exceptional Children, Toronto, Canada, April 1966. P. 9-17.

**Covington, M.V. Promoting creative thinking in the classroom: the process of curriculum development. Cited by H.J. Klausmeier (Ed.), Research of Significance to Education, in press.

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Covington, M.V. The effect of anxiety on various types of ideational output measures in complex problem solving. Paper read at Western Psychological Association, San Francisco, California, May, 1967.

Covington, M.V. The effectiveness of training for problem-solving efficiency and creative thinking as a function of differing ability levels among children. Paper read at Western Psychological Association, Honolulu, Hawaii, June, 1965.

**Covington, M.V. Training for creative understanding in reading: some experimental evidence. Cited in Reading and the Cognitive Processes. Proceedings of the International Reading Association, Dallas, Texas, 1966. P. 13-22.

Covington, M.V., & Crutchfield, R.S. Facilitation of creative problem solving. Programmed Instruction, 1965 4(4), 1,2,8-10.

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**Crutchfield, R.S. Creative thinking in children: Its teaching and testing. Cited by H. Brim, R.S. Crutchfield, & W. Holtzman, Intelligence: Perspectives. New York: Harcourt, Brace & World, 1966. P. 33-64.

**Crutchfield, R.S. Instructing the individual in creative thinking. Cited in New Approaches to Individualizing Instruction. Princeton, New Jersey: Educational Testing Service, 1965. P. 13-26.

Crutchfield, R.S. Nurturing the cognitive skills of productive thinking. Cited in 1969 ASCD Yearbook. Washington, D.C.: Association for Supervision and Curriculum Development, 1969.

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Olton, R.M., & Crutchfield, R.S. Developing the skills of productive thinking. Cited by P. Mussen, J. Langer, & M.V. Covington (Eds.), New Direction in Developmental Psychology. New York: Holt, Rinehart and Winston, in press.

**Olton, R.M. et al. The development of productive thinking skills in fifth-grade children. Technical report, 1969, University of Wisconsin, R & D Center for Cognitive Learning.

**Copies of any of these papers, except those marked with asterisks which are unavailable, may be obtained from Dr. Richard S. Crutchfield or Dr. Martin V. Covington, co-directors of The Creative Thinking Project, Department of Psychology, University of California, Berkeley, California. Please specify the particular items desired.